

Nrupatunga

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Skills

- Python | C++ | C | Matlab | CUDA
- Caffe | MXNet | PyTorch | Tensorflow | TFLite | PyTorch-Lightning
- Vim | Neovim | Git | TMUX | MSVC | QT | Eclipse | Android JNI/NDK | DearImGui

Experience

Senior Staff Engineer **LightMetrics** **Bangalore** **12/2022 - Current**

- Developed the multi-stage **drowsiness detection algorithm** end-to-end, maintaining and ensuring reliability in real-world conditions
- Extracting and fusing features from eye openness time-series for robust multi-class prediction with associative feature modeling
- Designed and optimized a rolling window detection algorithm that leverages past predictions and progressive alerting to resolve detection ambiguities, significantly reducing on-field false positives
- Developed a custom visualization tool to integrate video, time-series data, and model statistics, enhancing understanding of data interactions and accelerating algorithm development ([demo](#))
- Developed yawning and nodding detection algorithms as early indicators of drowsiness, enhancing proactive alerting mechanisms
- Identified performance bottlenecks, initiated TFLite adoption despite technical debt, showing 30-50% improvement across modules
- Mentored vision engineers in algorithm development and metrics definition keeping business requirements and constraints in mind

Staff Research Engineer **Byju's OSMO** **Bangalore** **09/2019 - 12/2022**

- Localization module to detect game tangibles: YOLOv5 object detection model trained with synthetic and minimal real data. Adoption of improved CloU loss and modified NMS
- Built a continuous orientation estimation model using a multi-classifier approach with mean-shift smoothing
- Developed a mobile-friendly single-shot oriented bounding box detection module to regress center and orientation attributes
- Quantify the potential of synthetic dataset-only training for localization tasks to reduce the development time for designers and engineers
- Built SSD/CenterNet-based single-shot hand and fingertip detectors for content retrieval using phygital interaction. Adoption of asymmetrical focal loss to improve the detection
- Developed algorithm to extract the table attributes to facilitate the key information extraction in report cards
- Developed a preprocessing algorithm to eliminate data variabilities in kids' handwriting and enhance input quality
- Built a classification model to identify the kids' interaction while writing. Frame-to-frame optimization to improve the OCR performance and user experience
- Developed a calibrated character recognition model using focal loss and knowledge distillation
- Developed a tool to create ambiguous digits data using Joint-VAE for model calibration and comparing models' performance ([demo](#))
- Keypoint-based visual elements detection for auto-grading worksheets

Deep Learning Research Engineer **Whodat** **Bangalore** **04/2017 - 08/2019**

- Live face verification with the selfie and KYC document: Built ResNet-based models to improve the vector representation of faces combining inter and intra-marginal loss functions
- Monocular depth, segmentation, and normal map estimation to estimate planes and their orientation and centroids to assist the placement of virtual objects in the real world

Technical Lead **Samsung R&D** **Bangalore** **07/2012 - 03/2017**

- Implemented SqueezeNet-based food recognition model for Indian food categories
- Built a segmentation model for sky map segmentation for horizon detection
- Nearest neighbor image retrieval using GIST descriptor for detecting duplicate images
- Developed algorithm for detection of low-light, poorly lit faces for one-touch auto image enhancement solution on Galaxy S6
- Bilinear resizer module for less memory architecture in the photo editor. Red-eye correction, Blur detection algorithm
- C-Level Optimization and Multi-Threaded Performance Enhancement for Photo-Editor Effects
- Design and development of the JNI framework for Touch-Focus USP commercialized on Galaxy S5. Recognition for the effort

Education

Master of Engineering in Signal Processing **Indian Institute of Science** **Bangalore** **2010 - 2012**

Bachelor of Engineering in Electronics and Communication **Sri Jayachamarajendra College of Engineering** **Mysore** **2005 - 2009**

Publications

- **Nrupatunga**, Aashish Kumar, Anoop Rajagopal; *Phygital Math Learning with Handwriting for Kids*. NeurIPS 2021 Workshop on Math AI for Education ([link](#))